Better Buildings®
U.S. DEPARTMENT OF ENERGY

Better Buildings Residential Network Peer Exchange Call Series

Low-Income Residential Energy Efficiency Best Practices – Part 1

March 23, 2023

U.S. DEPARTMENT OF ENERGY

Agenda and Ground Rules

- Moderator
  - **Jonathan Cohen,** Better Buildings Residential Network, DOE Residential Buildings Integration Program (RBI)
- Agenda Review and Ground Rules
- Residential Network Overview and Upcoming Call Schedule
- Opening Poll
- Featured Speakers
  - **Steve Nadel,** American Council for an Energy-Efficient Economy (ACEEE)
  - **Bethany Kitch,** Tennessee Valley Authority (TVA)
  - **Charity Fain,** Community Energy Project (CEP)
- Open Discussion
- Closing Poll and Announcements

Ground Rules:

1. **Sales of services and commercial messages are not appropriate** during Peer Exchange Calls.
2. Calls are a safe place for discussion; **please do not attribute information to individuals** on the call.

The views expressed by speakers are their own, and do not reflect those of the Dept. of Energy.

Join the Network

Member Benefits:

- Recognition in media, social media and publications
- Speaking opportunities
- Updates on latest trends
- Voluntary member initiatives
- One-on-One brainstorming conversations

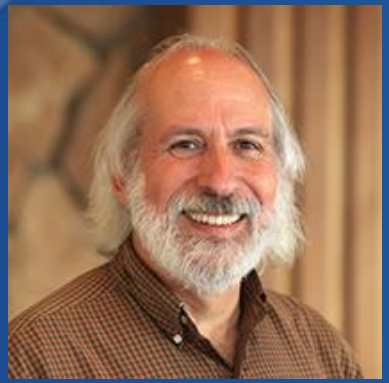
Commitment:

- Members only need to provide *one number*: their organization's number of residential energy upgrades per year, or equivalent.

Upcoming Calls (2nd & 4th Thursdays):

- *4/13: Low Income Residential Energy Efficiency Best Practices – Part 2*
- *4/27: Energy Efficiency and Demand Flexibility – Promoting and Scaling Grid-Interactive Efficient Buildings (GEBs)*

Peer Exchange Call summaries are posted on the Better Buildings website a few weeks after the call



Steve Nadel

American Council for an Energy-Efficient Economy (ACEEE)

U.S. DEPARTMENT OF ENERGY

Meeting The Challenge: A Review of Energy Efficiency Program Offerings for Low-income Households

Steven Nadel

Executive Director, ACEEE

Diana Morales

Local Policy Research Analyst, ACEEE

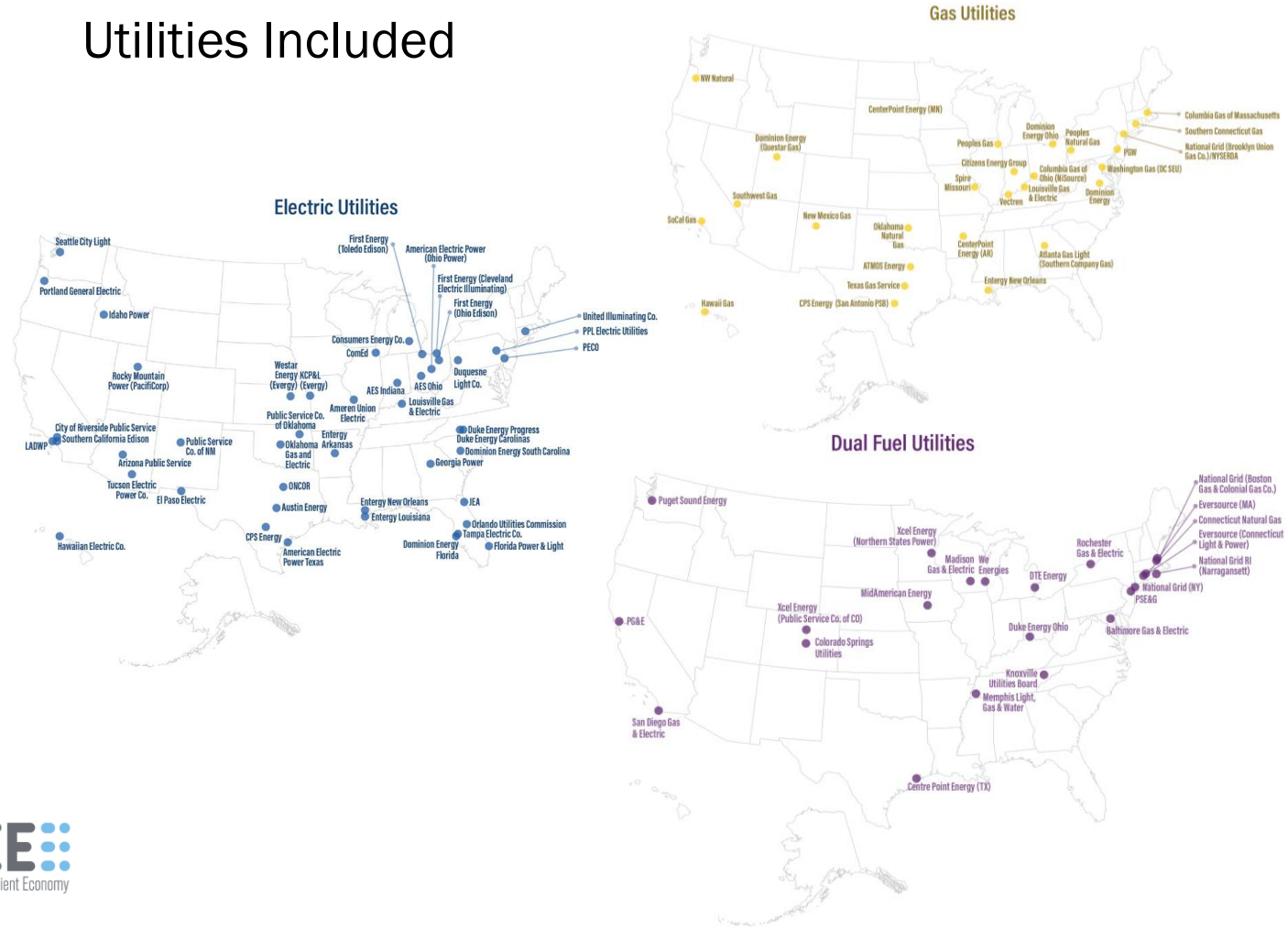
ACEEE

American Council for an Energy-Efficient Economy

Study Background and Objectives

- Update to our 2017 report
- New report uses data from 2019
- How have results changed in the five years since our previous study?
- How do the utility programs compare across spending, savings, and customers served? Who is achieving deep savings and serving many households?
- How well are utilities serving their low-income populations? What % of the low-income population receive services from each utility?
- Do utilities have equity-related goals? And if so, what do these look like?

Utilities Included



ACEEE
American Council for an Energy-Efficient Economy

Data Findings

- Spending of about $936 million in 2019 on ratepayer funded low-income energy efficiency programs, up significantly from a similar study based on 2015 data.
- Median electric and gas utility LI spending is about 13% of total energy efficiency program budgets.
  - **This level of spending represents a significant shortfall relative to the approximately 27.5% of the U.S. population who are income-qualified for these programs.**
- Average program spending per participating low-income customer was $2,059 in 2019 and spending averaged over all income-eligible customers was only $36. At this current spending rate:
  - **It will take 57 years to offer average program services to all currently income-eligible households.**
  - **To provide average program services to all eligible households over 20 years, spending would need to nearly triple.**

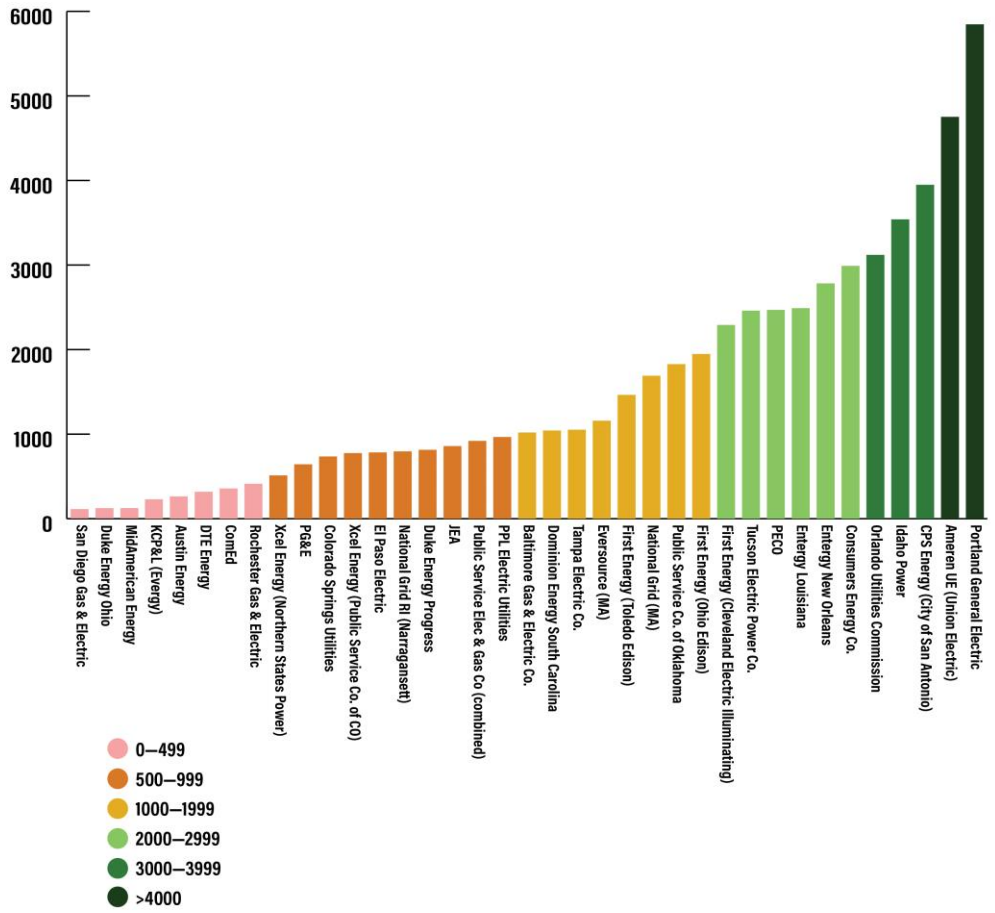
Data Findings (2)

- The programs in our database served about 1.5 million program participants in 2019
  - **Many received low-cost measures such as LED lightbulbs and energy-saving kits; tens of thousands received more comprehensive weatherization services.**
- Average participation rate among LI customers was ~5% (based on households <= below 200% poverty level).
- Some states have recently established a goal of at least 1% average annual savings for low-income customers
  - **In our study averaged only 0.55%.**
  - **Nationwide, energy efficiency programs across all programs and income levels are reducing energy consumption by 0.72%.**

Data Findings (3)

- Several utilities stand out for strong low-income program performance, such as several utilities in California, Commonwealth Edison, Eversource, National Grid, and Detroit Edison.
  - **These utilities allocate substantial funding, offer comprehensive services, often have multiple programs, and work with partners to address different segments of the eligible population (e.g., single-family and multifamily retrofits as well as low-cost measures).**
  - **These utilities are all in states with some sort of mandate to advance energy equity or that have targets for LMI programs**
- Low-income energy efficiency programs rarely use equity metrics and commitments (e.g., on energy burden) to inform their program offerings.

Electric utilities' distribution in savings per low-income program participant 2019



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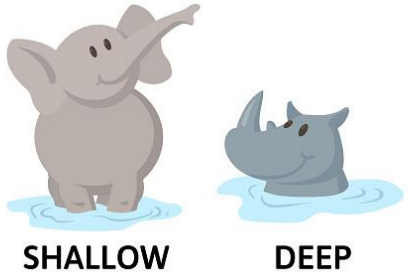
Deep and Shallow Retrofits

- Low-cost programs with inexpensive measures (light-bulbs, energy-saving kits) can reach many households but savings limited
- Ultimately, to reduce energy burdens, comprehensive retrofits needed that can reduce energy bills by >20% but that might cost over $5000/home.
- Should seek funding to steadily ramp-up programs so they can serve most eligible households with these comprehensive retrofits over 20 years.



Low-income Energy Efficiency Program Design Best Practices

- Planning and coordination
  - Community engagement
  - Leverage multiple existing eligibility criteria
  - One-stop shop approach
  - Fuel neutral program
  - Market segmentation
- Funding and financing
  - For LI, grants, not loans
  - Leverage diverse funding sources; braid funds
  - Often need funds for home repairs

Source: City of Denver website, 'Community Engagement'.

Program Design Best Practices (2)

Source: Whillans, S. 2022. Better Weatherization Is Within Sight. NRDC. https://www.nrdc.org/experts/sam-whillans/better-weatherization-within-sight

- Effective measures, messaging, and targeting
  - Health and safety measures
  - Direct install and rebate programs
  - Targeting high energy users and vulnerable (high burdens)
  - Work with trusted local groups
- Evaluation and quality control
  - Metrics on program outcomes including savings and impact on energy burdens
  - Workforce development and training

Contact Information

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Full report: www.aceee.org/research-report/u2205

ACEEE
American Council for an Energy-Efficient Economy

Bethany Kitch

Tennessee Valley Authority (TVA)

Home Uplift: transforming energy equity in the Valley

Bethany Kitch

Senior Program Manager,
EnergyRight® Residential

Home Uplift's mission

Partner with local power companies and community organizations to transform lives and communities through energy efficiency upgrades for income-qualified households.

Home Uplift goals

Reduce energy costs

for participants.

$10,000 per home

spent on home upgrades on average.

Health and safety costs at or below 10%

of total upgrade costs across the project.

Quantify non-energy impacts

of weatherization for participants.

Property eligibility

ELIGIBLE

- ✓ Single family dwellings
- ✓ Duplexes
  Only the qualifying individual's side will be eligible for upgrades
- ✓ Manufactured homes
  Must be on a permanent foundation
- ✓ Modular homes
- ✓ Townhouses

NOT ELIGIBLE

- ✓ Multifamily dwellings
- ✓ New homes
- ✓ Residences that are not separately metered
- ✓ Commercial, industrial, unoccupied, or time-share properties
- ✓ Manufactured homes built prior to 1976
- ✓ Homes weatherized utilizing TVA funding in past 20 years

TVA EnergyRight

ELIGIBILITY

To qualify, participants must:

- Complete a Home Uplift application
- Provide supporting documentation
- Currently reside at the address associated on the application
- Be a primary electric/gas account holder of the Local Power Company
- Be at or below the income threshold – 200% Federal Poverty Level or 80% Area Median Income whichever is higher

EnergyRight

Eligible Home Uplift measures

HVAC Systems

Duct Systems

Attic & Wall Insulation

Windows & Doors

Water Heating

Lighting

Air Sealing

Refrigerators

HIGH LEVEL

Operations process

Responsibility of the LPC in the LPC Delivered Model.

Responsibility of the CR in all models.

LPC and/or CR

Identify participants

CR

Assist customer with application

CR

Approve or disapprove & notify applicant

CR

Add approved applicant

RESIDENTIAL SERVICES HUB

LPC or CR

Perform pre assessment

RESIDENTIAL SERVICES HUB

LPC or CR

Manage contractor installations

RESIDENTIAL SERVICES HUB

LPC or CR

Perform post inspection

RESIDENTIAL SERVICES HUB

CR

Draw funds from funding sources

RESIDENTIAL SERVICES HUB

CR

Pays contractor (EFT)

RESIDENTIAL SERVICES HUB

EnergyRight

Thank you!

Bethany Kitch

Senior Program Manager
Tennessee Valley Authority
EnergyRight® Residential

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Charity Fain

Community Energy Project (CEP)

COMMUNITY ENERGY PROJECT

Best Practices in Low-Income Energy Efficiency

Community Energy Project, Inc., believes that everyone deserves a safe, healthy, and efficient home, regardless of income.

CEP Executive Director

Charity Fain

Executive Director

Charity Fain has over 25 years of experience building stronger communities in the US and around the world. As the Executive Director, she designs programs that provide free home services focused on safety, health, and energy efficiency for low-income Oregonians. Charity also leads CEP's advocacy efforts at the city and state level to push for climate and energy justice.

Prior to CEP, Charity's professional experience focused on increasing civic engagement and political participation around the world. She has a BA in International Relations from The American University with a minor in Russian language.

Programs and Services

Education

- DIY Weatherization
- Lead Poisoning Prevention
- Oregon Community Solar
- Online Resources

In Home Services

- Home Energy Audits
- Weatherization
- Safety Repairs
- Whole Home Energy Retrofits

Advocacy

- Energy Justice
- Decarbonization/ Electrification
- Healthy Homes

Overview

- ✓ Community Centered Approach
- ✓ Client Education
- ✓ Sound Building Principles
- ✓ Funding for Repairs
- ✓ Grants Over Incentives/Rebates
- ✓ Work with Trusted CBOs

Community Centered Approach

- Clients' needs vary
  - Design services that support client
- Staff that are from, or understand, the communities served

Community driven approaches create trust with households, contractors and CBOs

Client Education

Outreach and Education:

- Grid Modernization
- New EE tech
- Home Repair

Client Education

- Home Assessments: Meeting with clients in their home
- Meaningful Follow Up: Sustaining client relationship post installment

Sound Building Principles

All of CEP's In-Homes staff are:

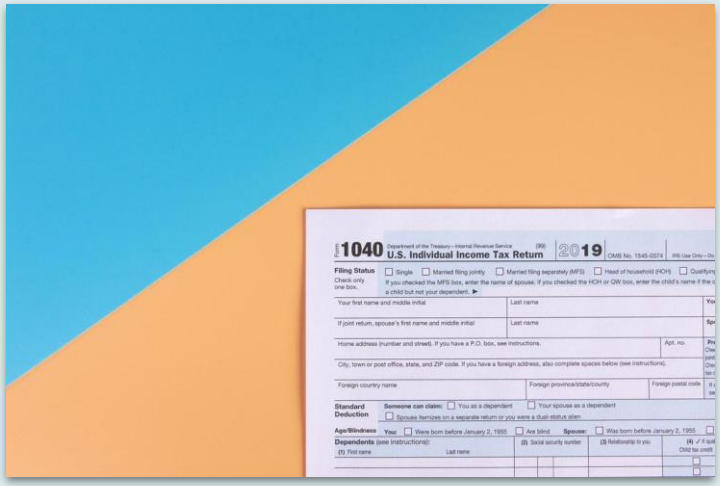
- BPI certified
- Conduct HES
- Use industry standards
- Receiving regular training

Sound Building Principles

CEP is a Licensed General Contractor

Grants Over Incentives/Rebates

Too many EE programs designed as tax rebates or incentives



Low-income households **do not** have the upfront funds

Funding for Repairs

Issues

- Major deferred maintenance
- Most EE or Weatherization programs do not include repair funds (or are inadequate)

Measure specific funding is *not* enough

Solution

✓ Repairs as part of EE upgrade programs.

Grants Over Incentives/Rebates

EE programs should cover 100% of home upgrade costs, which can include measures such as:

- ✓ Roof replacement
- ✓ Removal of asbestos or vermiculite
- ✓ Full electrical rewiring or panel upgrade
- ✓ Insulation in attic and walls
- ✓ Mechanical upgrades to all electric heat pumps and heat pump water heaters

Work with Trusted CBOs to Implement

CBOs should be funded to administer grant programs

1. Education and outreach
2. Income and participant verification
3. Home Energy and Repair audits
4. Creating a scope of work with the homeowner
5. Hiring and managing subcontractors
6. Managing QA and reporting process
7. Braid funds from multiple sources

Summary

Recommendations:

- ✓ Client Centered Approach
- ✓ Whole Home Funding
- ✓ Working with a CBO

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Community Energy Project, Inc., believes that everyone deserves a safe, healthy, and efficient home, regardless of income.


APRIL
11-13
2023
SAVE THE DATE
Better Buildings, Better Plants
SUMMIT
Better Buildings®
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Learn more: betterbuildingssolutioncenter.energy.gov/summit
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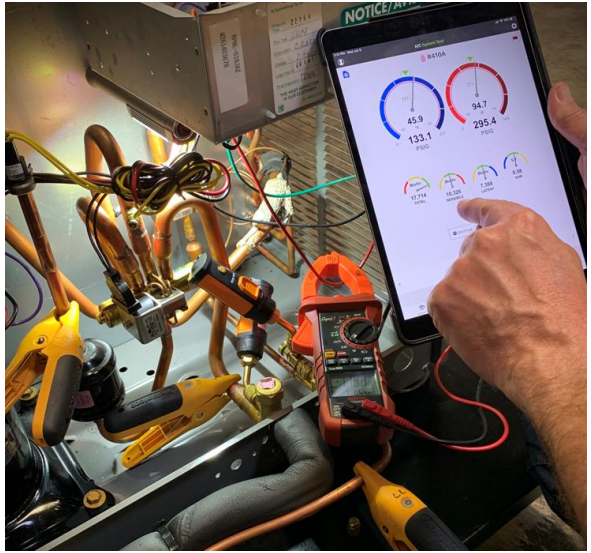
Heat Pumps, an Asterisk, and a Solution

Q: How do we decarbonize residential heating loads?

A: Heat Pumps*

*Improper installations reduce system performance, resulting in energy waste and comfort issues:

- One or more energy-wasting HVAC fault in 70–90% of homes[1]
- Estimated 9% residential HVAC energy waste nationally due to installation faults in CAC/ASHP[2]



Solution: Smart diagnostic tools help ensure heat pumps are installed properly, resulting in realized energy-efficiency and reduced energy waste.

1. EERE, 2019. Residential HVAC Installation Practices: A Review of Research Findings
2. Winkler et al. 2020. Impact of installation faults in air conditioners and heat pumps in single-family homes on U.S. energy usage. Applied Energy, Volume 278

Smart Tools for Efficient HVAC Performance (STEP) Campaign

Pacific Northwest NATIONAL LABORATORY

STEP CAMPAIGN

Scan this QR code to visit our website

Contact: christian.valoria@pnnl.gov

The STEP Campaign aims to increase adoption of smart diagnostic tools to streamline HVAC system performance testing and troubleshooting, reducing energy-wasting faults and improving occupant comfort.

To join the STEP Campaign, visit: bit.ly/3DFmEaE

HVAC Contractors and Technicians

- Reduce callbacks, improve consistency and quality, streamline processes
- Find out where to get training on smart diagnostic tools
- Be recognized for successful adoption of smart diagnostic tools!

Utilities and Program Implementers

- Streamline quality installation and quality maintenance programs
- Improve engagement with your contractors
- Be recognized for programs that utilize smart diagnostic tools!

HVAC Training Organizations

- Offer qualified training on System Performance with smart diagnostic tools
- Promote your training events
- Be recognized for providing training!

Weatherization Organizations

- Ensure your ASHP/CAC installations are operating at optimized efficiency
- Develop pilot with PNNL team
- Be recognized!

ORGANIZING PARTNERS

ACCA · BUILDING PERFORMANCE ASSOCIATION · CEE Working Together, Advancing Efficiency · HVAC Excellence · NATE · neea · U.S. DEPARTMENT OF ENERGY

Buildings UP

The Buildings Upgrade Prize

AMERICAN MADE
U.S. DEPARTMENT OF ENERGY

Building capacity to transform U.S. buildings into energy-efficient and clean energy-ready homes, commercial spaces, and communities

Upgrading existing buildings to efficiently run on clean energy will help address climate change. This means transitioning **residential and commercial buildings** to efficient electric equipment, such as **heat pumps and heat pump water heaters**, and ensuring comfort with measures such as **insulation and air sealing**.

Teams participating in **Buildings UP** will develop innovative plans to leverage the billions of dollars through the Bipartisan Infrastructure Law, the Inflation Reduction Act, utility rebate programs, and many other funding sources available and capitalize on this unprecedented opportunity to improve our homes, businesses, and communities.

Buildings UP will award more than **$22 million** in cash prizes and expert technical assistance to bring winning ideas to life.

www.heroX.com/buildingsUP

Form Your Team and Submit Your Application by July 2023!

- Community-based organizations
- Local governments
- Utilities
- Non-profit organizations
- For-profit energy efficiency companies
- and more!

Multi-stakeholder teams are encouraged

Application support available for new and under-resourced teams

Follow Buildings UP on HeroX for prize info and updates
Questions: buildingsUP@nrel.gov

Explore the Residential Program Guide

Resources to help improve your program and reach energy efficiency targets:

- Handbooks - explain *why* and *how* to implement specific stages of a program.
- Quick Answers - provide answers and resources for common questions.
- Proven Practices posts - include lessons learned, examples, and helpful tips from successful programs.
- Technology Solutions NEW! - present resources on advanced technologies, **HVAC** & **Heat Pump Water Heaters**, including installation guidance, marketing strategies, & potential savings.
- Health + Home Performance Infographic NEW! – spark homeowner conversations.

https://rpsc.energy.gov

Health + Home Performance Infographic

DOE's new Health + Home Performance Infographic reveals the link between efficiency and health – something everyone cares about. Efficiency programs and contractors can use the question-and-answer format to discover a homeowner's needs.

The infographic is ideal for the "kitchen table" conversations where people decide what to do – and who they want to do it. It also has links for homeowners to find a qualified contractor if they do not already have one.

Download this infographic from DOE's Better Buildings Residential Network.

Looking for photos to help tell your energy efficiency story? Visit our image libraries: https://www.energy.gov/eere/better-buildings-residential-network/articles/image-libraries

Thank You!

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Please send any follow-up questions or future call topic ideas to:
bbresidentialnetwork@ee.doe.gov